

بیولوژی حشرات:

- ▶ تخم
- ▶ لارو
- ▶ شفیره
- ▶ حشره کامل

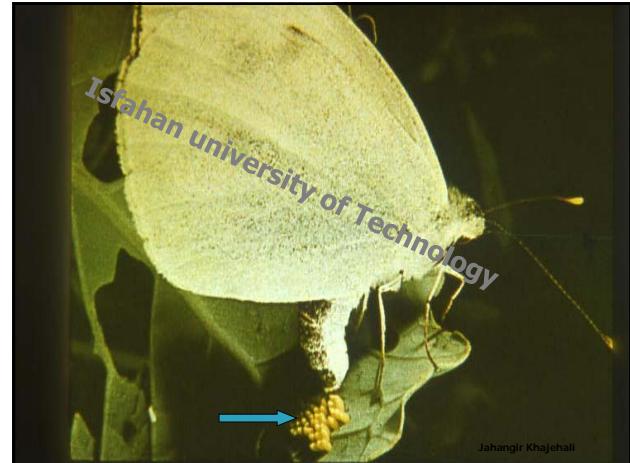
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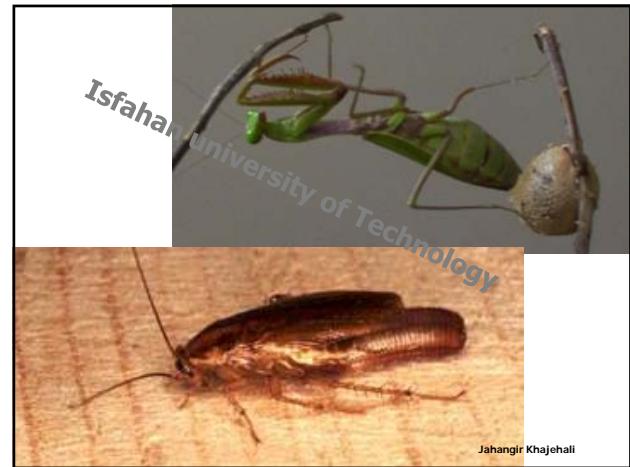
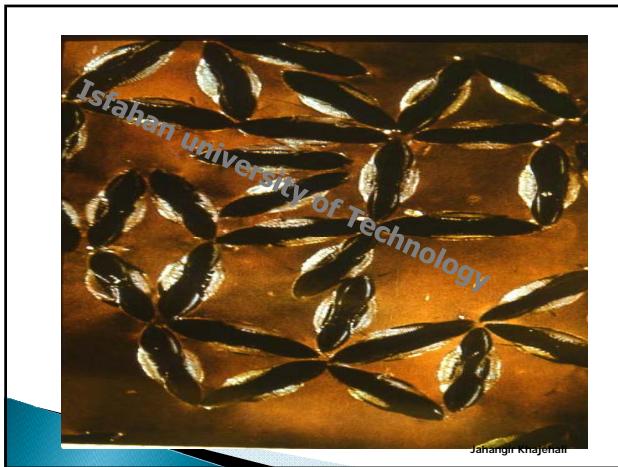
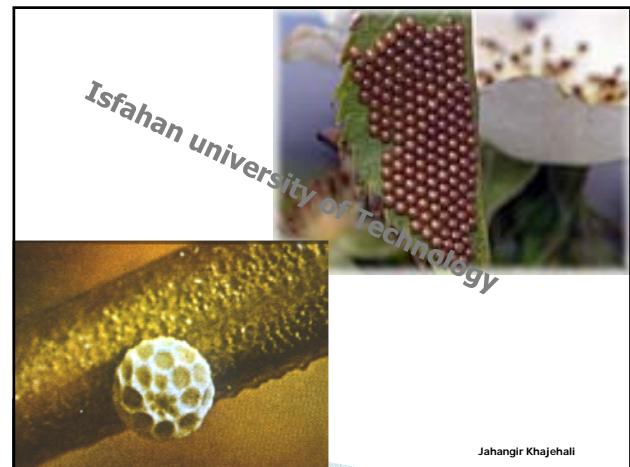
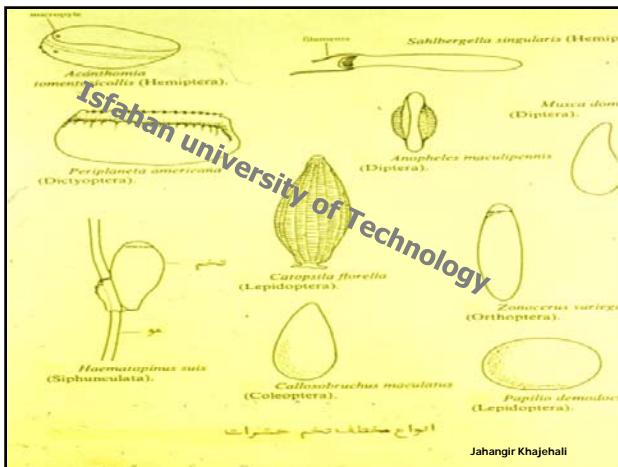
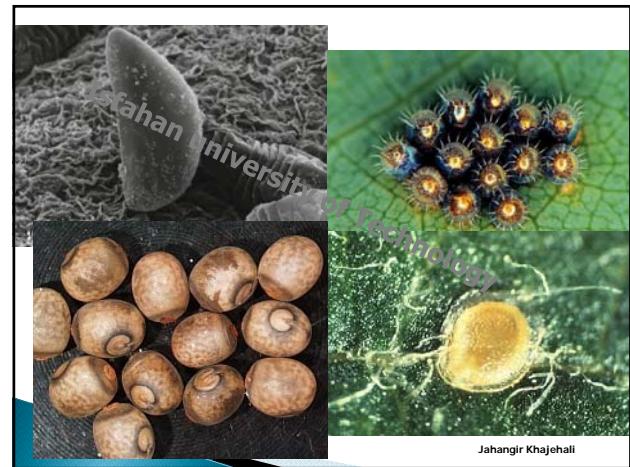
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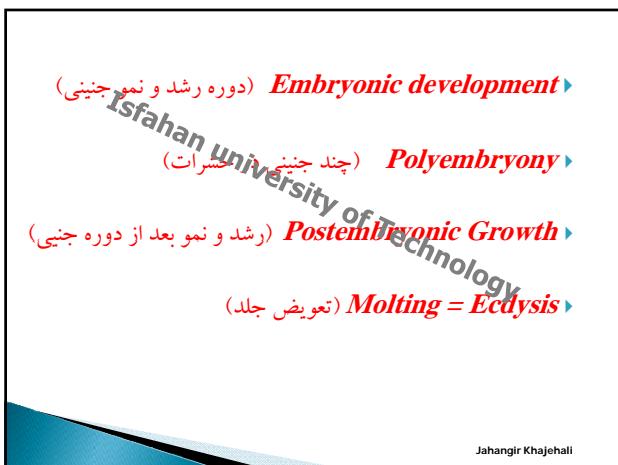
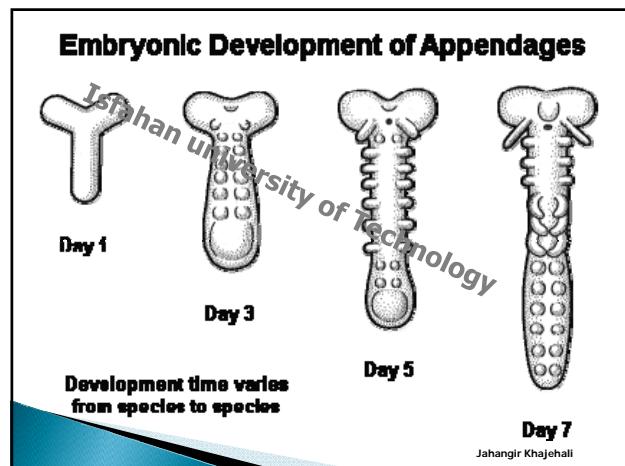
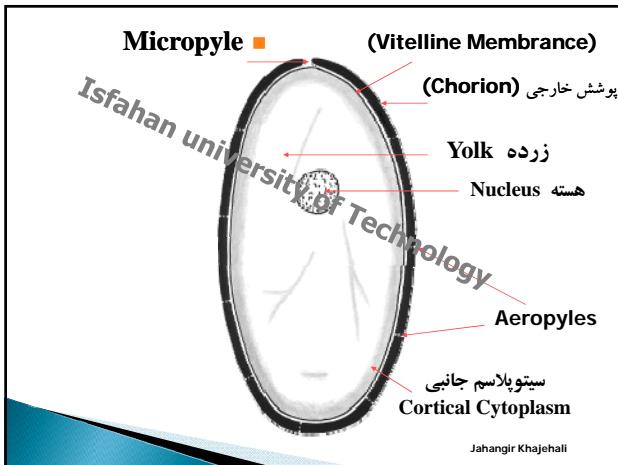
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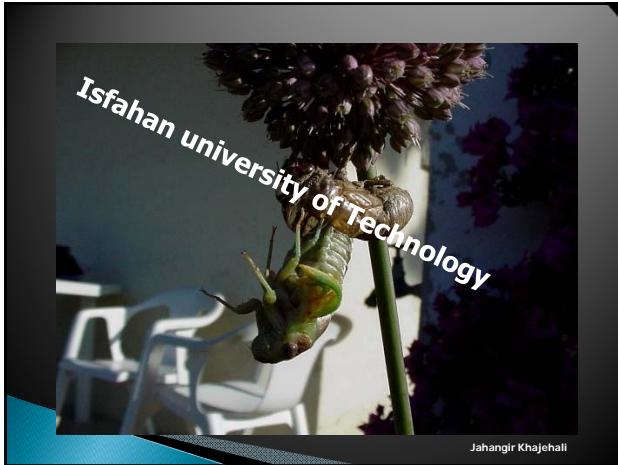
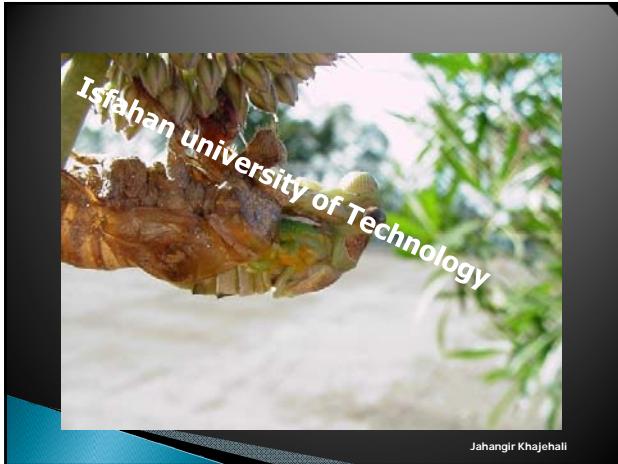
BIOLOGY OF INSECTS

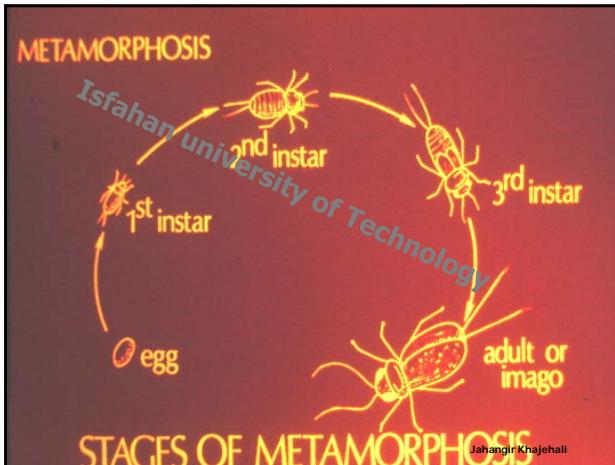
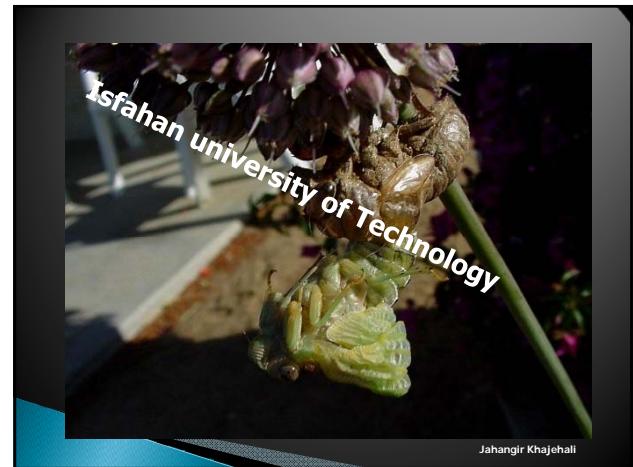
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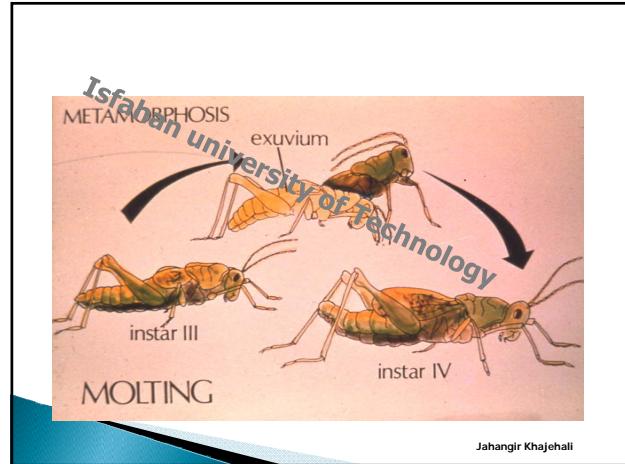




METAMORPHOSIS

دگردیسی یا استحصال در حشرات

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Two Types of Metamorphosis

- ▶ SIMPLE METAMORPHOSIS – has THREE stages
- ▶ COMPLETE METAMORPHOSIS has FOUR stages.

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What is metamorphosis?

- ▶ Metamorphosis refers to the way that certain organisms develop, grow, and change form.
- ▶ Metamorphosis actually means "change".

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4 STAGES OF COMPLETE METAMORPHOSIS

- ▶ Egg
- ▶ Larva
- ▶ Pupa
- ▶ Adult

Stages in Life Cycle of Flies

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3 STAGES OF SIMPLE METAMORPHOSIS

- ▶ Egg
- ▶ Nymph
- ▶ Adult

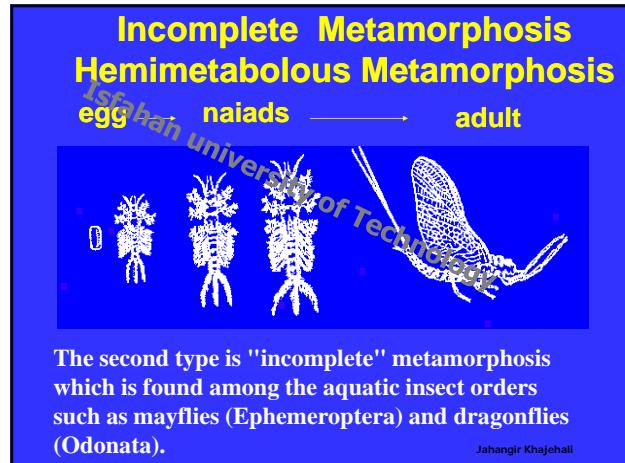
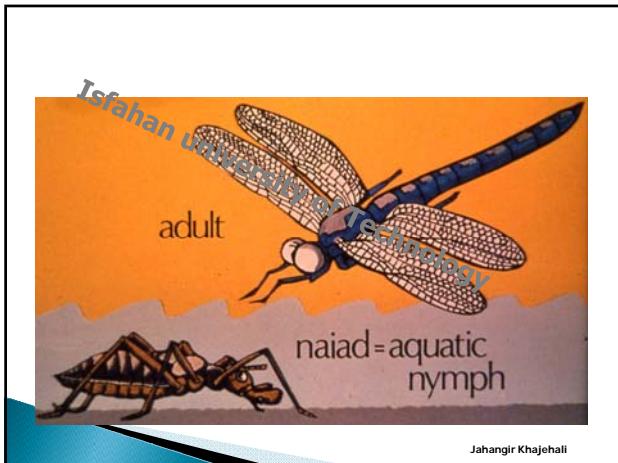
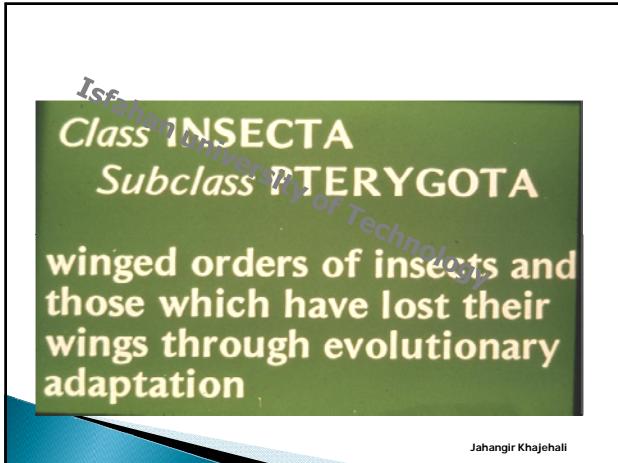
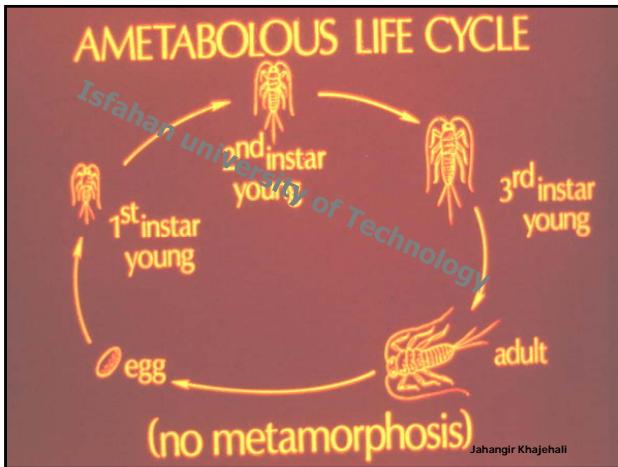
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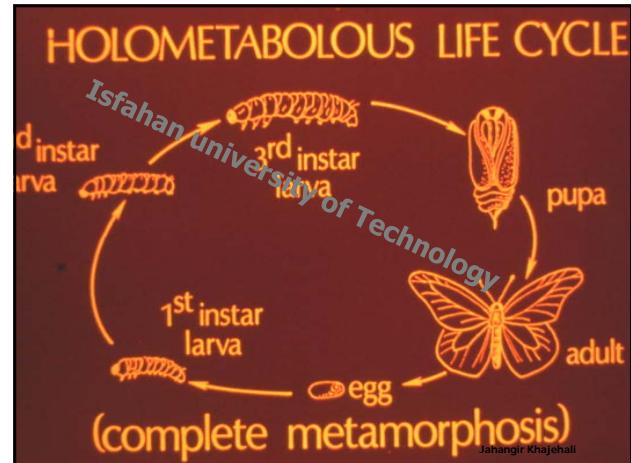
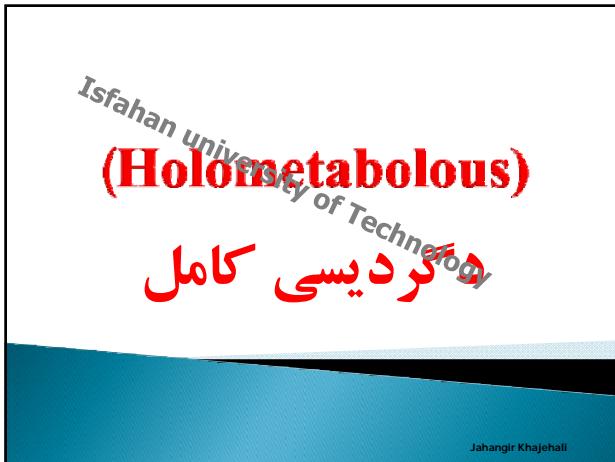
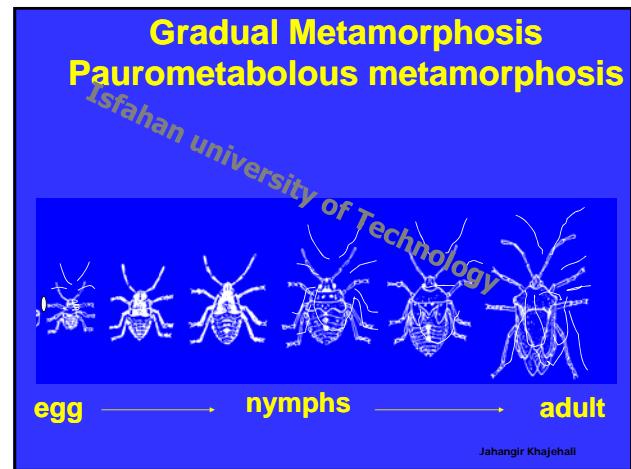
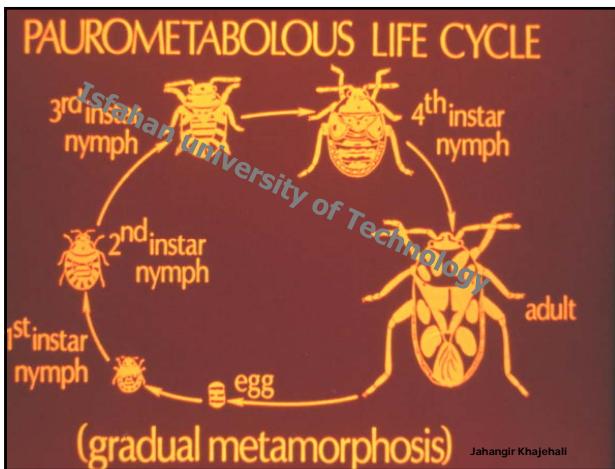
adult

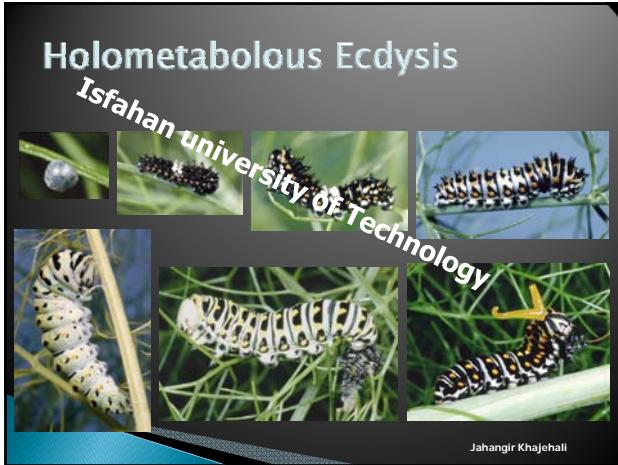
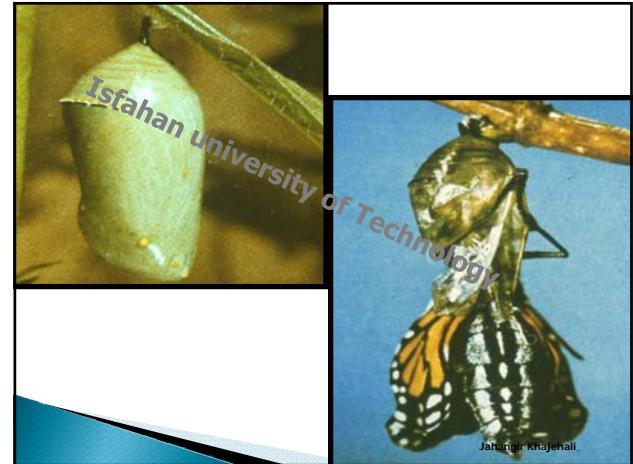
nymphs

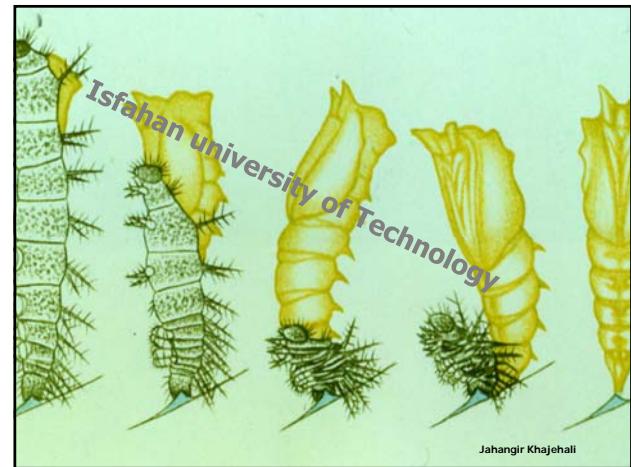
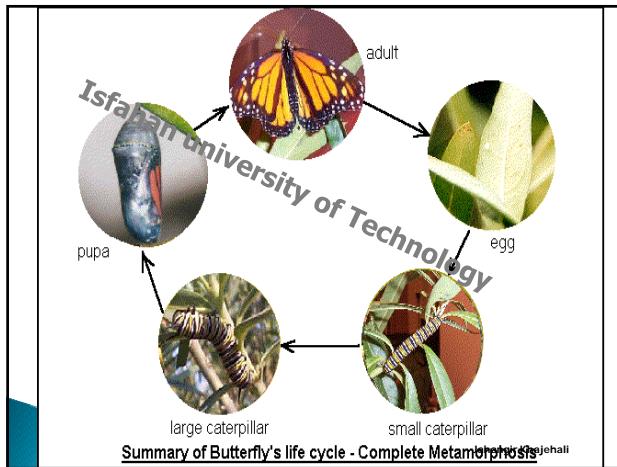
egg

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General Differences Between Nymph/Larva

HARACTER	NYMPH	LARVA
Feeding pads	External	Internal
Shape	Like adult	Unlike adult
Compound eye	Prevalent	Absent
Mouth type	Like adult	Often unlike
Food	Like adult	Often unlike

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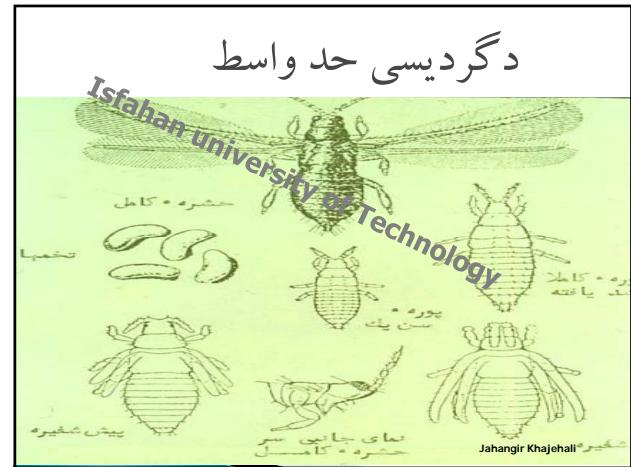
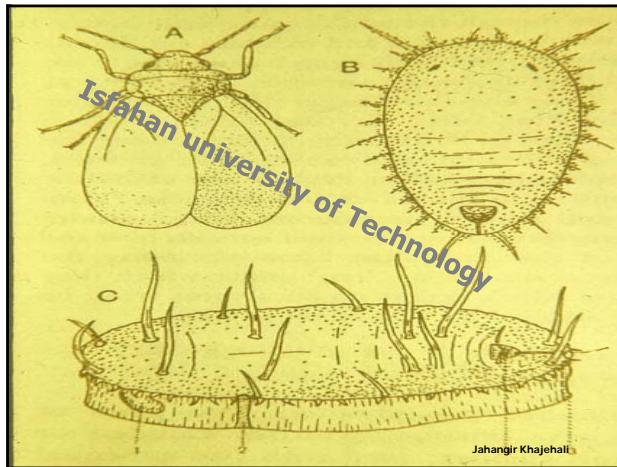
د گر دی سی کامل

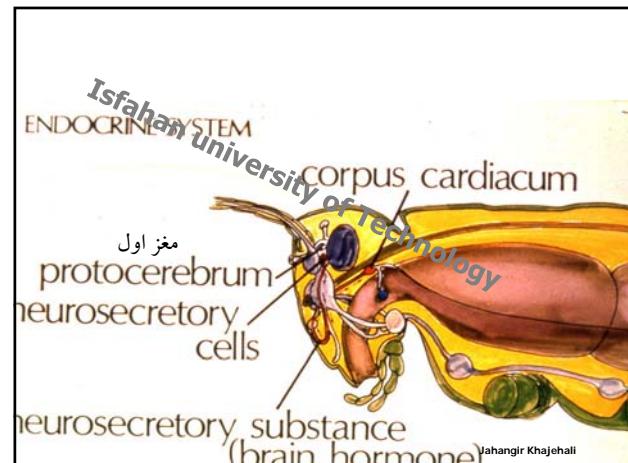
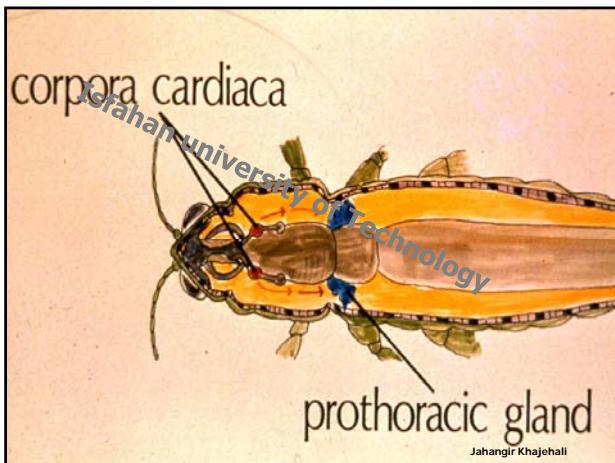
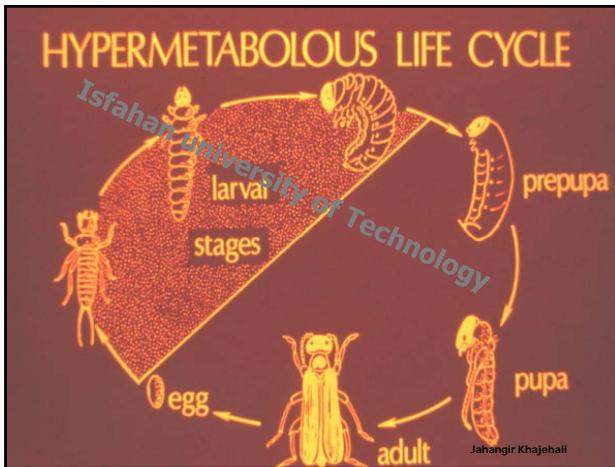
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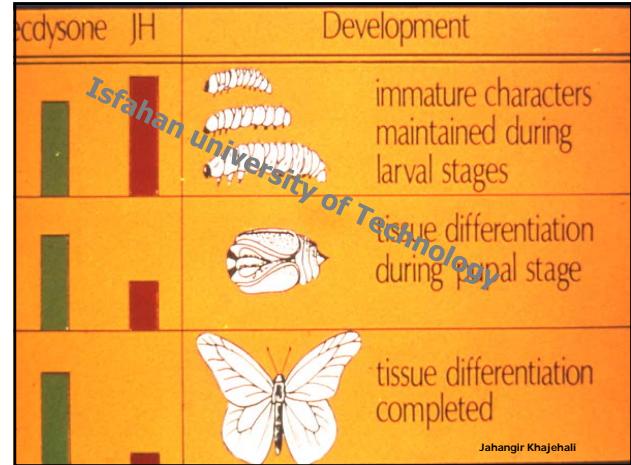
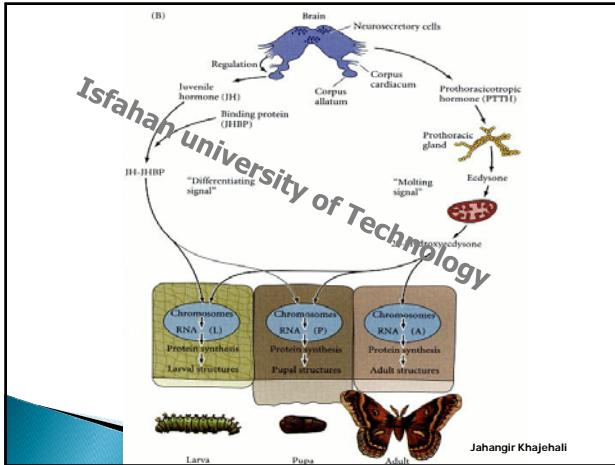
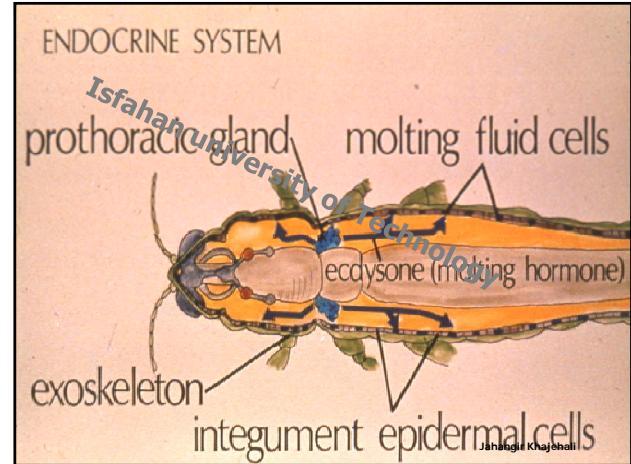
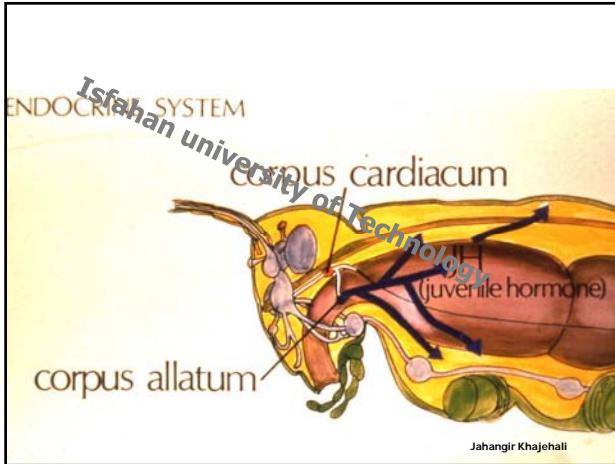
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حشره نایانچ پوره نام دارد.
حشره نایانچ لارو نام دارد
(عمول اکرمی شکل)
رشد بالاها خارجی می باشد
راشد بالاها در مرحله لاروی
داخلی است.
لاروها چشم مرکب ندارند.
بعد از آخرین تقویض جلد
لاروی مرحله استراحت یا
شیرگی دارند.

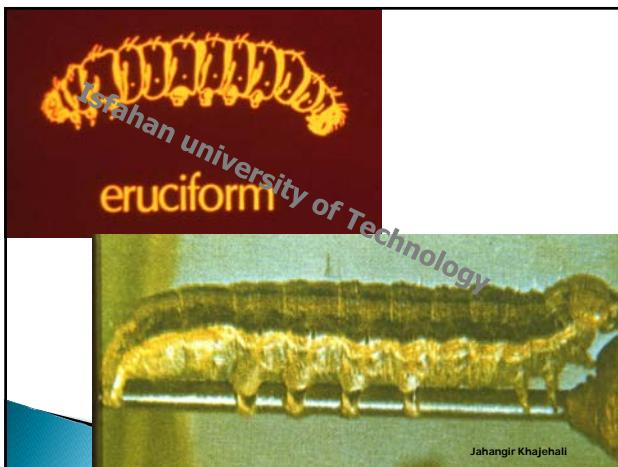
حشره نایانچ شبیه به حشره بالغ است.
حشره نایانچ پوره نام دارد.
داشته باشد پوره های زنگوله ای.
مرحله استراحت ندارند.

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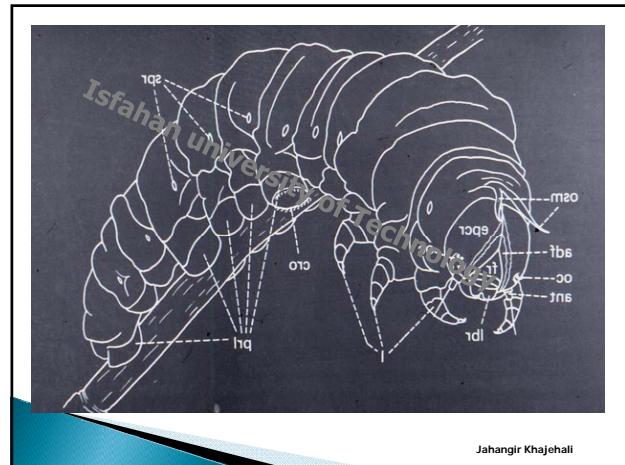




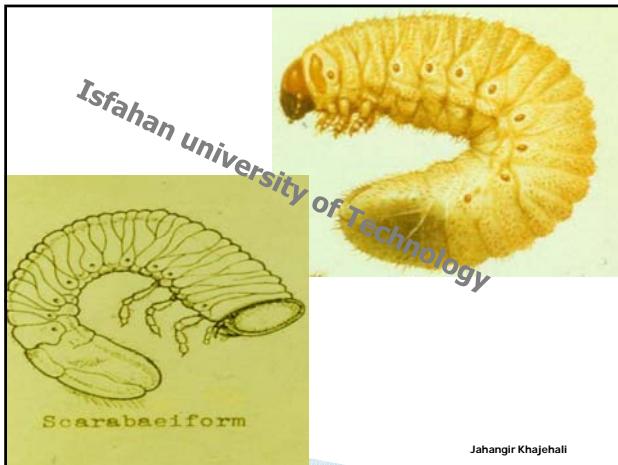
اشکال مختلف لاروی:

- ▶ اروسیفرم (Eruciform) : بروانه ها، دم عرقیان و زنبورها
 - ▶ اسکارا بی فرم (Scarabaeiform) : Scarabaeidae (کرم سفید رشه)
 - ▶ کامپودی فرم (Camodeiform) : بال پوشان، تریسهها، سخت
 - ▶ الاتری فرم (Elateriform) : Elateridae (کرم مفتولی)
 - ▶ ورمی فرم (Vermiform) : کک ها، بال غشائیان، دو بالان و برخی از بروانه ها و سخت بال پوشان

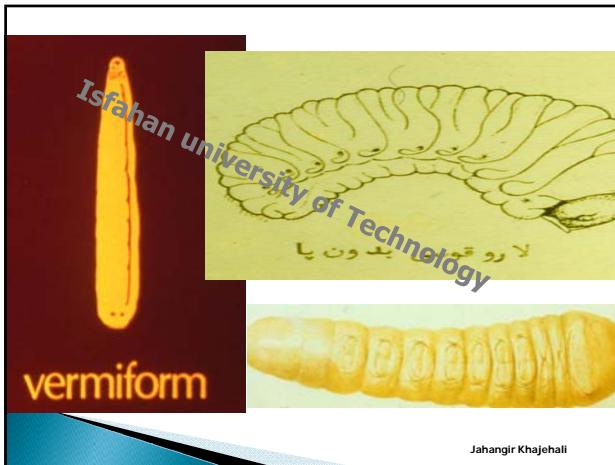
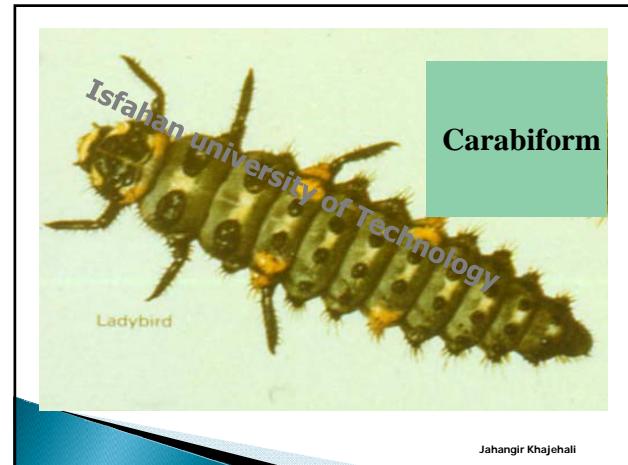
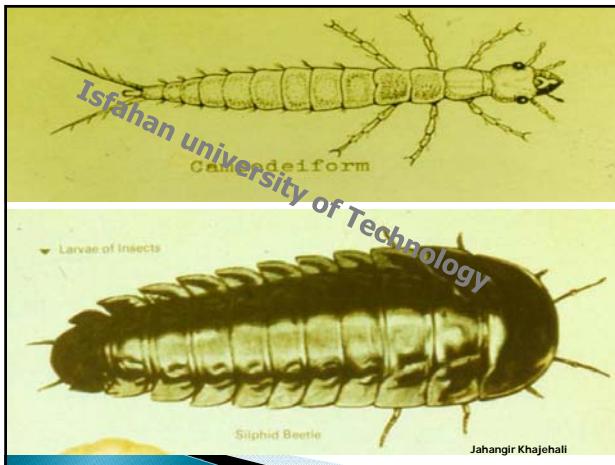
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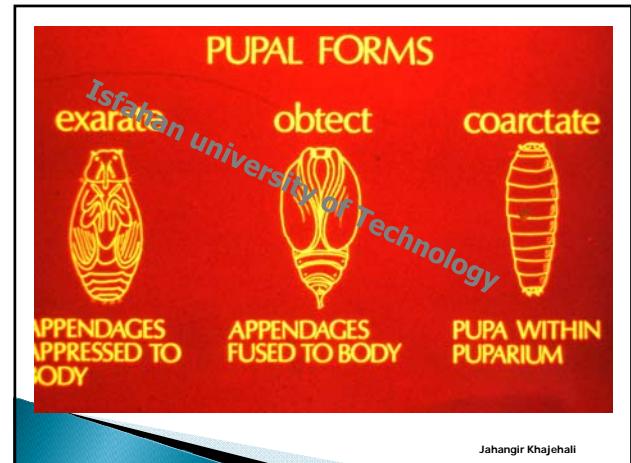
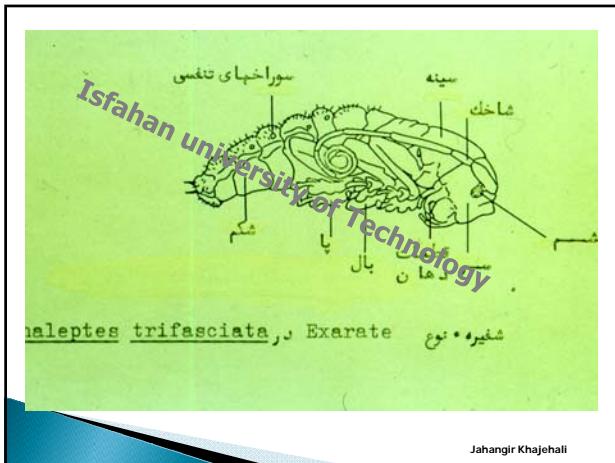
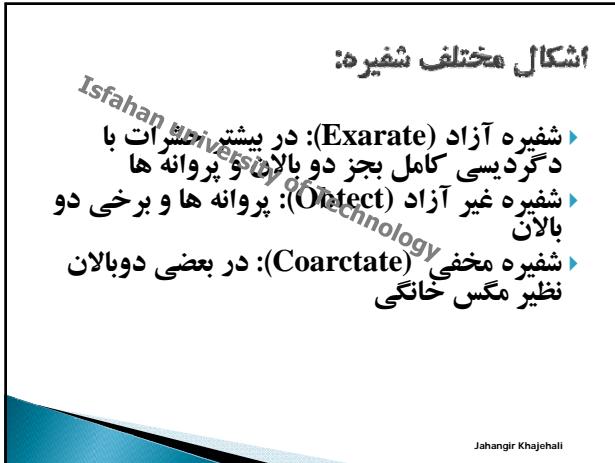
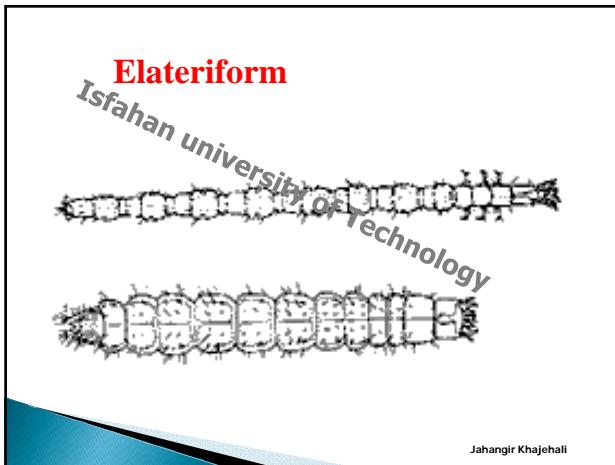


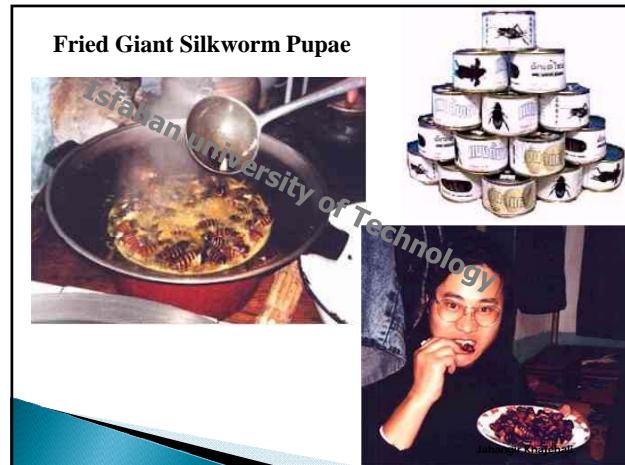
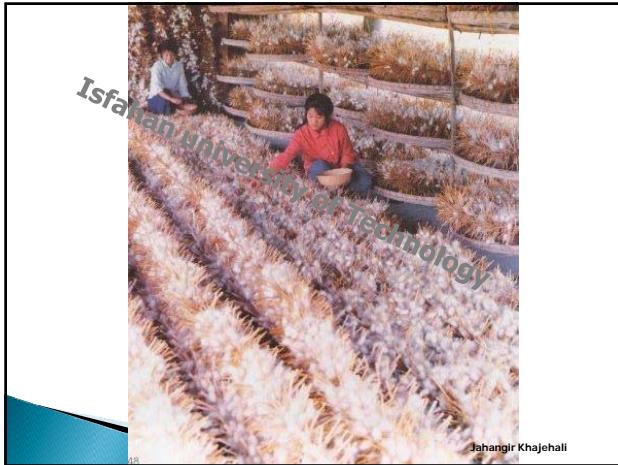
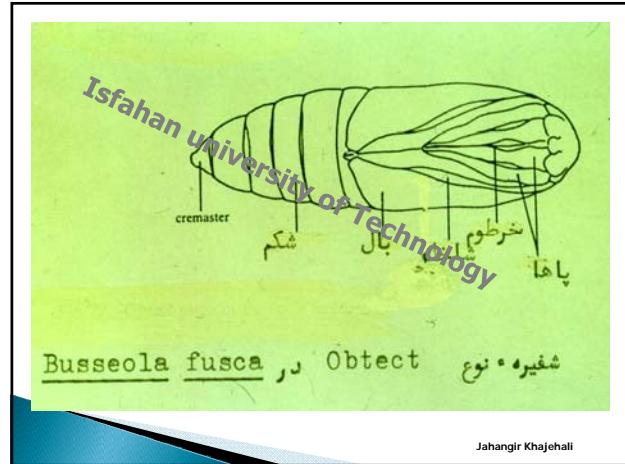
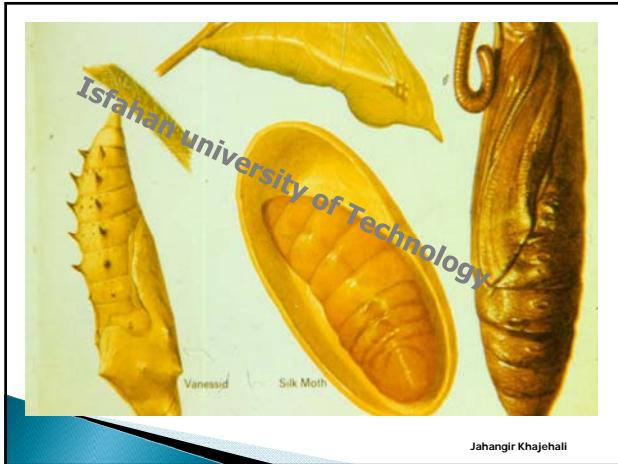
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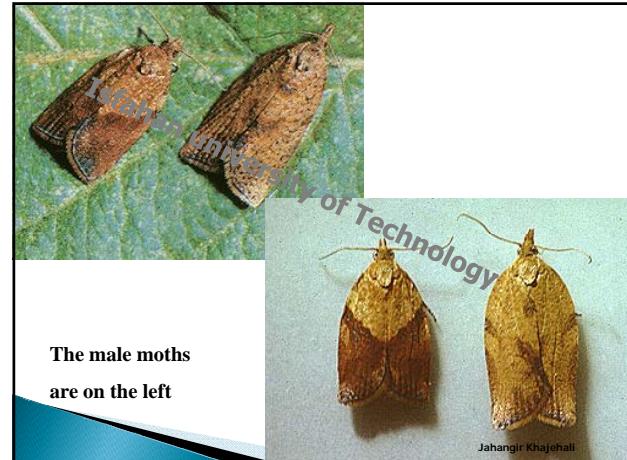


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Exceptions to normal reproduction:

1. Parthenogenesis
2. Hermaphroditism

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Exceptions to normal reproduction:

1. Parthenogenesis
(asexual Reproduction)



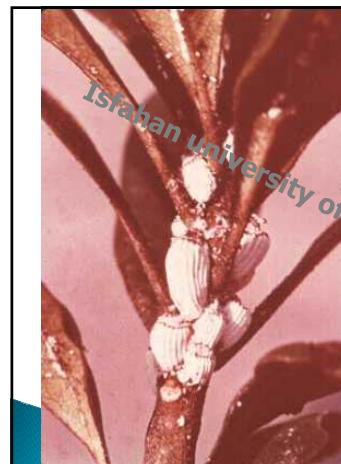
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MOST
INSECTS
REPRODUCE
SEXUALLY

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Cotton
Cushion
Scale

One individual
Is of both sexes



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Polymorphism or caste determination
چند شکلی بین افراد یک گونه حشره

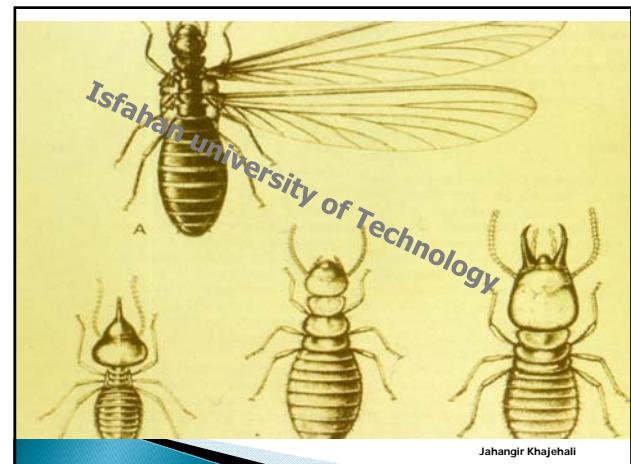
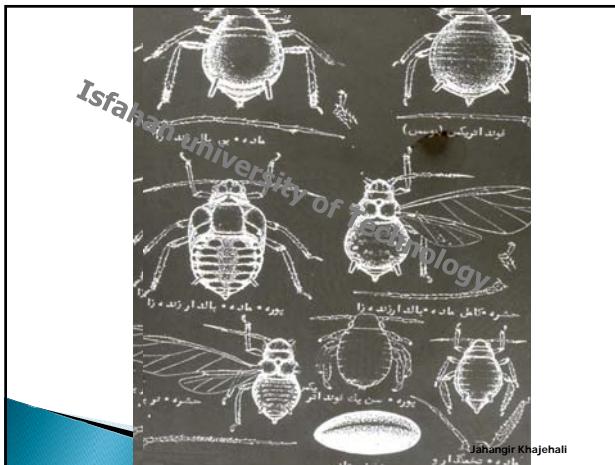
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بکر زایی

اختیاری
(دایمی یا اتفاقی)

اجباری
(شته)

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سازش با محیط و تغیرات در زندگی حشرات:

قدمت حشرات

- ▶ تعداد گونه ها
- ▶ روش های رشد و نمو و تکثیر
- ▶ اندازه و جنسه
- ▶ وجود بالها
- ▶ وجود اسلکت خارجی
- ▶ تنوع سیستم زندگی

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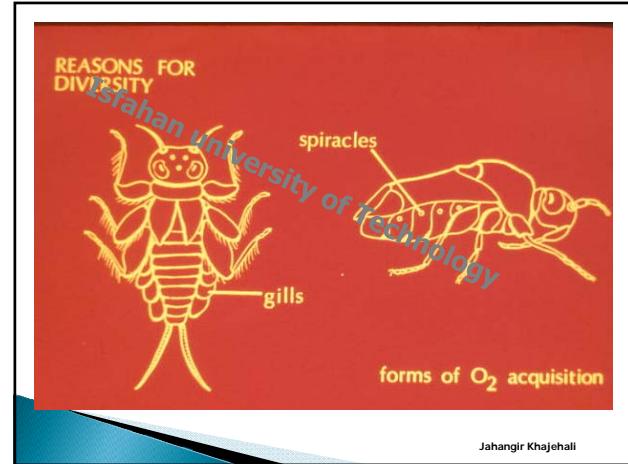
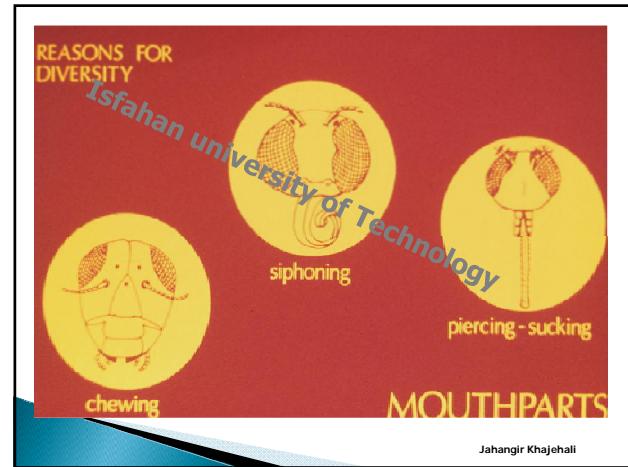
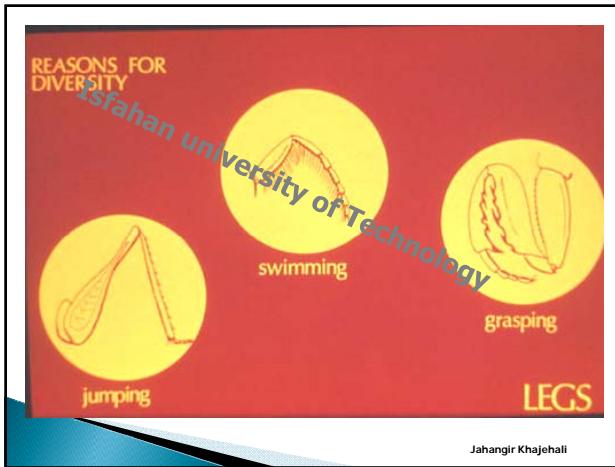
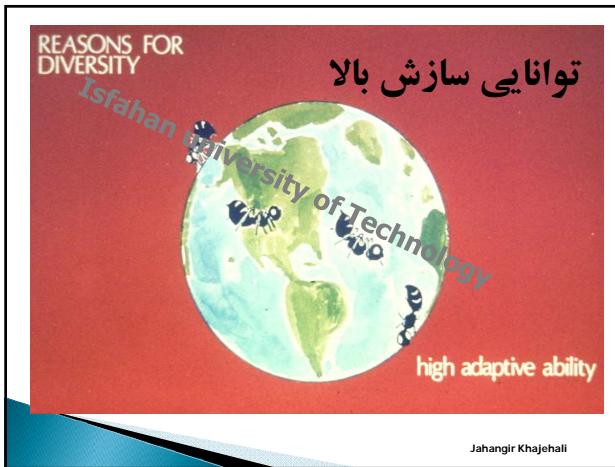
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**INSECT DIVERSITY
SUCCESS & SURVIVAL**

علل هووفقیت حشرات

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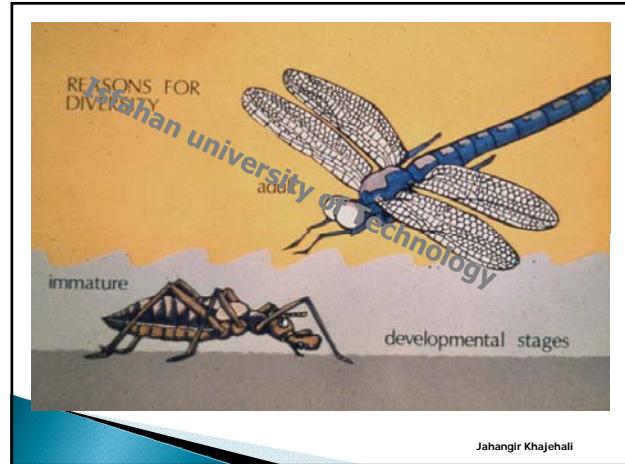
دیاپوز اجباری (خواب) Dormancy

▪ خواب زمستانه Hibernation

▪ خواب تابستانه Aestivation

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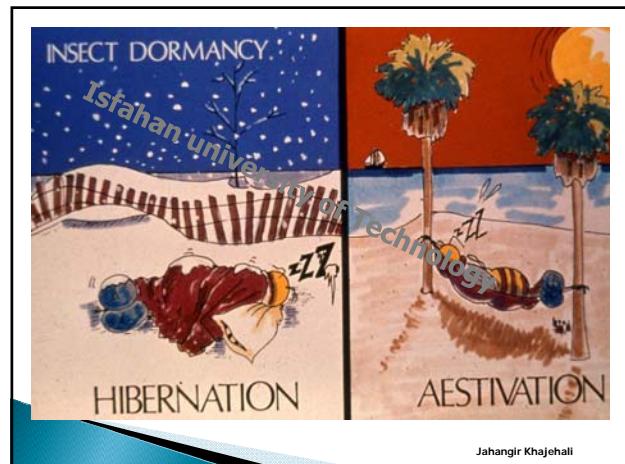


DIAPAUSE

عامل اصلی
Photoperiod

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FACULTATIVE DIAPAUSE

Independent of life cycle

Regulated by
Unfavorable Environmental Conditions

- دما
- رطوبت
- غذا

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OBLIGATORY DIAPAUSE

dependent on life cycle

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